REMARKS

A Request for Continued Examination (RCE) is submitted concurrently with this Amendment.

Claims 1, 4, 6, 8, 10, 12, 14-15, 17, 19, 24, 26, 28, 30 and 38-44 are all the claims presently pending in the application. Claim 1 has been amended to more particularly define the invention. Claims 38-44 have been added to claim additional features of the claimed invention. Claims 2-3, 5, 7, 9, 11, 13, 16, 18, 20-23, 25, 27, 29 and 31-37 have been canceled.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicant specifically states that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 1, 8, 26, 28 and 30 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Morita, et al. (U.S. Patent No. 6,121,636). Claims 6, 12, 14, 15, 19 and 24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Morita, et al. Claims 4, 6, 10, 12, 14, 15, 17 and 19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Morita, et al., in further view of Steigerwald, et al. (UK Patent No. 2 333 899 A).

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

The claimed invention (e.g., as recited in claim 1) is directed to a light-emitting semiconductor device which includes a substrate, a plurality of semiconductor layers which comprise group III nitride group compound semiconductors and are laminated on the substrate by crystal growth, an emission layer formed on a first side of the substrate, and a mirror surface formed on a second side of the substrate opposite the first side.

The mirror surface includes a light transmission layer which directly contacts the substrate, has luminous transparency, and comprises at least one material selected from a group consisting of metal oxides and ceramics, and a reflection layer which is formed on the light transmission layer, comprises a metal, and reflects lights emitted from the emission layer. Importantly, the second side of the substrate includes split lines for dividing the

substrate into chips.

Conventional light-emitting semiconductor devices form a metal layer on the reverse side of the substrate before scribing the substrate (Application at page 2, para. [0014]). However, in that case, predetermined regions of the substrate are needed to position the device for scribing and, therefore, these regions cannot be covered with the metal layer (Application at page 2, para. [0014]). This results in these regions being wasted and increasing cost and reducing yield.

In the claimed invention, on the other hand, the second side of the substrate (e.g., the back surface which is opposite the emission layer) includes split lines for dividing the substrate into chips (Application at Figure 6B; page 9, para. [0068]-[0070]). In one exemplary embodiment, these split lines are formed before forming the mirror surface. Therefore, there is no need to keep the metal layer from any predetermined regions for positioning purposes. Therefore, cost is reduced and yield is improved.

II. THE PRIOR ART REFERENCES

A. The Morita Reference

The Examiner alleges that Morita teaches the claimed invention (e.g., claims 1, 8, 26, 28 and 30) and suggests the claimed invention (e.g., claims 6, 12, 14, 15, 19 and 24). Applicant submits, however, that there are elements of the claimed invention which are neither taught nor suggested by Morita.

Morita discloses a semiconductor light emitting device which includes GaN semiconductor layers stacked on a front surface of a sapphire substrate, and a reflective film formed on a rear surface (Morita at Abstract).

However, Applicant submits that Morita does not teach or suggest "*wherein said second side of said substrate comprises split lines for dividing said substrate into chips*" as recited in claim 1.

As noted above, unlike conventional light-emitting semiconductor devices which form a metal layer on the reverse side of the substrate before scribing the substrate, the claimed invention includes a substrate with a second side (e.g., the back surface which is opposite the emission layer) which includes split lines for dividing the substrate into chips (Application at Figure 6B; page 9, para. [0068]-[0070]). In one exemplary embodiment,

these split lines are formed before forming the mirror surface. Therefore, there is no need to keep the metal layer from any predetermined regions for positioning purposes. Therefore, cost is reduced and yield is improved.

Clearly, Morita does not teach or suggest these novel features. Indeed, Morita does not even recognize at least one of the problems (e.g., processing difficulties) which the claimed invention was intended to address.

In fact, nowhere does Morita teach or suggest that a split line is formed on the back surface (e.g., the second side) of the substrate. In the present invention, since a split line is formed on the back surface of the substrate, there is no need to form a split line after forming a reflection layer. Layers laminated on the substrate can be recognized (e.g., through the substrate) from the back surface of the substrate when forming a split line, and that enables one to carry out positioning more easily.

Further, since the split line may be formed before forming the metal reflection layer, clogging of the blades can be prevented while carrying out scribing. When a light transmission layer is formed on the substrate on which the split line is formed, the light transmission layer is deposited on the surface of an adhesive tape on which a wafer is installed. Then organic materials can be prevented from evaporating from the surface of the adhesive tape and being taken into the metal reflection layer in a process of depositing the metal reflection layer. As a result, reflectivity of the metal reflection layer can be maintained at high value.

In the original specification page 3, para. [0011] to page 5, para. [0018] of the present Application, problems in the conventional devices are disclosed. In the present invention, the split line is formed on the back surface of the substrate in advance, and then the light transmission layer and the metal reflection layer are deposited thereon. By employing such structure, the effect described in the original specification at page 16, para.[0068] to page 17, para. [0070] can be obtained.

Thus, Morita clearly does not teach or suggest split lines formed on a second side of the substrate for dividing the substrate into chips. Thus, it is clear that Morita does not teach or suggest the novel features of the claimed invention. Thus, the Morita device would likely experience the same problems encountered with conventional devices (e.g., after the mirror surface is formed, it would be impossible to form a scribe line in the reverse side of the

substrate, and the reflection layer would deteriorate quickly causing a reduction in reflectivity of the mirror surface) as described in the Background section of the Application.

Therefore, Applicant submits that there are elements of the claimed invention that are not taught or suggested by Morita. Therefore, the Examiner is respectfully requested to withdraw this rejection.

B. The Steigerwald Reference

The Examiner alleges that Steigerwald would have been combined with Morita to form the claimed invention of claims 4, 6, 10, 12, 14, 15, 17 and 19. Applicant submits, however, that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention.

Steigerwald discloses a light-emitting diode (LED) in which an opaque material 14 is placed between the LED die 16 and the die attach epoxy 20. The opaque material 14 may be used to improve thermal resistance or light output of the LED (Steigerwald at Abstract).

However, Applicant submits that these references would not have been combined as alleged by the Examiner. Indeed, these references are directed to different problems. Specifically, Morita is intended to prevent a deterioration in luminance, whereas Steigerwald is intended to improve the reliability of LED packages. Clearly, no person of ordinary skill in the art would have considered combining these references.

Further, Applicant submits that the Examiner can point to no motivation or suggestion in the references to urge the combination as alleged by the Examiner. Indeed, the Examiner merely states that it would have been obvious to combine these references "because Steigerwald teaches that these metals are more highly reflective of certain III-N wavelengths and for the purpose of reducing manufacturing costs". This assertion, without more, is insufficient to support the combination.

Moreover, neither Steigerwald, nor Morita, nor any combination thereof teaches or suggests "*wherein said second side of said substrate comprises split lines for dividing said substrate into chips*" as recited in claim 1.

As noted above, unlike conventional light-emitting semiconductor devices which form a metal layer on the reverse side of the substrate before scribing the substrate, the claimed invention includes a substrate with a second side (e.g., the back surface which is

opposite the emission layer) which includes split lines for dividing the substrate into chips (Application at Figure 6B; page 9, para. [0068]-[0070]). In one exemplary embodiment, these split lines are formed before forming the mirror surface. Therefore, there is no need to keep the metal layer from any predetermined regions for positioning purposes. Therefore, cost is reduced and yield is improved.

Clearly, Steigerwald does not teach or suggest these novel features. Indeed, Steigerwald does not even recognize at least one of the problems (e.g., processing difficulties caused by the reflective surface on the back surface of the wafer) which the claimed invention was intended to address.

As noted above, in the present invention, since a split line is formed on the back surface of the substrate, there is no need to form a split line after forming a reflection layer. Further, since the split line may be formed before forming the metal reflection layer, clogging of the blades can be prevented while carrying out scribing.

In addition, when a light transmission layer is formed on the substrate on which the split line is formed, the light transmission layer is deposited on the surface of an adhesive tape on which a wafer is installed. Thus, organic materials can be prevented from evaporating from the surface of the adhesive tape and being taken into the metal reflection layer in a process of depositing the metal reflection layer. As a result, reflectivity of the metal reflection layer can be maintained at high value.

Steigerwald, on the other hand, merely discloses an opaque material 14 which may be used to improve thermal resistance. Thus, Steigerwald is completely unrelated to the claimed invention. Indeed, nowhere does Steigerwald teach or suggest these novel features including a substrate with a second side (e.g., the back surface which is opposite the emission layer) which includes split lines for dividing the substrate into chips

Therefore, it is clear that Steigerwald does not teach or suggest the novel features of the claimed invention. Thus, the Steigerwald device would likely experience the same problems encountered with conventional devices (e.g., after the mirror surface is formed, it would be impossible to form a scribe line in the reverse side of the substrate, and the reflection layer would deteriorate quickly causing a reduction in reflectivity of the mirror surface) as described in the Background section of the Application.

Therefore, Applicant submits that these references would not have been combined and

even if combined, the combination would not teach or suggest each and every element of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw this rejection.

III. FORMAL MATTERS AND CONCLUSION

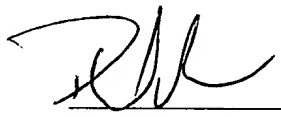
In view of the foregoing, Applicant submits that claims 1, 4, 6, 8, 10, 12, 14-15, 17, 19, 24, 26, 28, 30 and 38-44, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 11/21/07



Phillip E. Miller, Esq.
Registration No. 46,060

McGinn & Gibb, PLLC
8321 Old Courthouse Road, Suite 200
Vienna, VA 22182-3817
(703) 761-4100
Customer No. 21254